What is claimed is:

1. A device for fragmenting particles of material, the device comprising:

a throwing wheel operable to generate a centrifugal force in the particles of material to accelerate the particles toward an impact speed;

an impact rotor including an impact surface operable to fragment the particles when the particles collide with the impact surface, wherein the impact rotor is operable to move the impact surface toward the particles to increase the particles' impact speed; and

a motor operable to power the impact rotor and the throwing wheel.

2. The device of claim 1 wherein:

a first motor is operable to power the throwing wheel, and

a second motor is operable to power the impact rotor.

3. The device of claim 1 wherein the impact speed of the particles is about 1,500 ft/s.

4. The device of claim 1 wherein the impact speed of the particles is 950 ft/s.

5. The device of claim 1 wherein:

the throwing wheel rotates about a wheel axis,

the impact rotor rotates about a rotor axis, and

the wheel and rotor axes are perpendicular or substantially perpendicular with each other.

6. The device of claim 1 wherein:

the throwing wheel rotates about a wheel axis,

the impact rotor rotates about a rotor axis, and

the wheel and rotor axes are aligned or substantially aligned with each other.

7. The device of claim 6 wherein the throwing wheel and impact rotor rotate in opposite directions.

8. The device of claim 1 wherein the throwing wheel rotates about a wheel axis and includes:

a hub through which the wheel axis passes and that is operable to receive particles of material to be accelerated and,

a channel operable to direct particles of material from the wheel hub toward a periphery of the wheel, and

a wheel exit located at the periphery and through which particles of material pass as the particles leave the throwing wheel.

9. The device of claim 8 wherein the throwing wheel includes 20 channels.

10. The device of claim 1 wherein the impact rotor rotates about a rotor axis and includes:

a rotor hub through which the rotor axis passes, and

a rotor periphery where the impact surface is located.

11. The device of claim 10 wherein the impact rotor includes 40 impact surfaces.

12. The device of claim 1 further comprising two or more impact rotors.

13. The device of claim 12 wherein each impact rotor is operable to revolve their respective impact surface on a circular path about a common rotor axis and the two or more circular paths are concentric with each other.

14. The device of claim 13 wherein each impact surface travels their respective circular path in a direction that is opposite to the direction an impact surface travels on an adjacent path.

15. A throwing wheel for accelerating particles of material toward an impact speed, the wheel comprising:

a center through which a wheel axis passes, wherein the throwing wheel rotates about the wheel axis when the throwing wheel is powered by a motor;

a periphery;

a hub located at the center of the throwing wheel and operable to receive particles of material; and

a channel extending from the hub toward the periphery and operable to direct particles of material from the wheel hub toward the periphery wherein, when the throwing wheel rotates about the wheel axis, the particles accelerate toward and exit through the periphery.

16. The throwing wheel of claim 15 wherein the channel extends from the hub toward the periphery in a straight or substantially straight direction.

17. The throwing wheel of claim 15 wherein the channel extends from the hub toward the periphery in a straight or substantially straight direction and intersects the periphery at about 90°.

18. The throwing wheel of claim 15 wherein the channel extends from the hub toward the periphery in a curved direction.

19. The throwing wheel of claim 15 wherein the channel has a rectilinear cross-section.

20. The throwing wheel of claim 15 wherein the wheel includes 20 channels.

21. An impact rotor for fragmenting particles of material, the rotor comprising:

a body including a rotor axis about which the impact rotor rotates when the impact rotor is powered by a motor, and a peripheral region located a radial distance away from the rotor axis; and

a plurality of impact teeth, each extending from the peripheral region and each including an impact surface operable to fragment particles of material when the particles collide with the impact surface, wherein each impact surface is angularly positioned relative to the rotor axis and a radius perpendicularly extending from the rotor axis toward the impact surface to increase the force generated in the particles at the moment of collision.

22. The impact rotor of claim 21 wherein each impact surface is angularly positioned between 90° and 0° relative to their respective radius, and between 45° and 0° relative to the rotor axis.

23. The impact rotor of claim 21 wherein each impact surface is angularly positioned about 34° relative to their respective radius, and about 0° relative to the rotor axis.

24. The impact rotor of claim 21 wherein each impact tooth extends from the peripheral region of the body in a direction parallel or substantially parallel to the rotor axis.

25 The impact rotor of claim 21 wherein each impact tooth extends from the peripheral region of the body in the same direction as a respective radius extending from the rotor axis toward each impact tooth.

26. The impact rotor of claim 21 wherein the body is a circular disk.

27. The impact rotor of claim 21 wherein the impact teeth are removably mounted to the peripheral region of the body.

28. The impact rotor of claim 21 wherein the impact rotor includes 40 impact teeth and each impact tooth includes one impact surface.

29. The impact rotor of claim 21 wherein the impact surface is flat or substantially flat.

30. The impact rotor of claim 21 wherein each impact surface is removably mounted to its respective impact tooth.

31. A method for fragmenting particles of material, the method comprising:

accelerating the particles of material toward an impact speed with a throwing wheel;

throwing the particles on a trajectory from an exit of the wheel;

moving an impact surface of an impact rotor toward particles of material to increase the impact speed of the particles; and

colliding the particles of the material with the impact surface to fragment the particles.

32. The method of claim 31 wherein accelerating the particles of material includes generating a centrifugal force in the particle.

33. The method of claim 31 wherein accelerating the particle of material includes exerting a tangential force on the particle that is perpendicular to a radius extending from a center of the throwing wheel toward the particle.

34. The method of claim 31 wherein accelerating the particle of material includes:

generating a centrifugal force in the particle; and

exerting a tangential force on the particle that is perpendicular to a radius extending from a center of the throwing wheel toward the particle.

35. The method of claim 31 wherein moving the impact surface includes revolving the impact surface around a rotor axis.

36. The method of claim 31 further comprising:

leaving the impact surface of the impact rotor after colliding with the impact surface;

moving an impact surface of a second impact rotor toward fragments of the particles of material; and

colliding the fragments with the impact surface of the second impact rotor.